

IT IS CLAIMED

1. A method for accessing information in a peer-to-peer network, the peer-to-peer network including a plurality of peer devices and a database system accessible by at least a portion of the peer devices, each of the peer devices being configured to store information files, and further being configured to share content from selected information files with at least a portion of the other peer devices in the network, the method comprising:

selecting a first information file;
generating, using fingerprinting algorithm, a first fingerprint ID relating to the content of the first information file; and
identifying the first information file using the first fingerprint ID.

2. The method of claim 1 wherein the fingerprinting algorithm corresponds to an MD5 Message-Digest algorithm.

3. The method of claim 1 wherein the fingerprinting algorithm corresponds to a Secure Hash Algorithm (SHA1).

4. The method of claim 1 wherein the first information file is stored at a first peer device, and wherein the first information file has an associated first filename, the method comprising:

storing the first filename and first fingerprint ID at the first peer device.

5. The method of claim 4 further comprising:
transmitting the first filename and the first fingerprint ID to the database system for storage therein.

6. The method of claim 5 wherein the database system corresponds to a remote database system.

7. The method of claim 1 further comprising:

selecting a second information file having content identical to the first information file;

applying the fingerprinting algorithm to the content of the second information file to thereby generate an identical first fingerprint ID to that of the first information

5 file; and

identifying both the first and the second information file using the first unique fingerprint ID.

8. The method of claim 7 wherein the first information file is stored at a
10 first peer device, and has a first associated filename, and wherein the second information file is stored at a second peer device, and has a second associated filename, the method further comprising:

storing the first associated filename and first fingerprint ID associated with the first information file in the database system; and

15 storing the second associated filename and first fingerprint ID associated with the second information file in the database system.

9. A method for accessing information in a peer-to-peer network, the peer-to-peer network including a plurality of peer devices and a database system accessible
20 by at least a portion of the peer devices, each of the peer devices being configured to store information files, and further being configured to share content from selected information files with at least a portion of the other peer devices in the network, wherein each shared file in the network has a respective fingerprint ID associated therewith relating to its file content, the method comprising:

25 transmitting a first message to the database system, the first message including a search request for locating files in the network which match a first search string; and

receiving a first response from the database system, the first response including first information relating to identified files stored in the network which match the first search string;

30 the first information further including an associated fingerprint ID for each identified file.

10. The method of claim 9 further comprising:
transmitting a second message to the database system, the second message including a first fingerprint ID selected from the first information; and
receiving a second response from the database system in response to the second
5 message;

the second response including second information, the second information including at least one network address corresponding to at least one peer device that has been identified as having access to at least one file corresponding to the first fingerprint ID.

10

11. The method of claim 10 further comprising:
transmitting a third message to a first peer device of the at least one peer devices, the third message corresponding to a request to retrieve a first file identified by the first fingerprint ID.

15

12. The method of claim 11 wherein the third message includes the first fingerprint ID.

13. The method of claim 11 further comprising:
receiving at least a portion of the file content of the first file from the first peer device in response to the third message.

20

14. A method for accessing information in a peer-to-peer network, the peer-to-peer network including a plurality of peer devices and a database system accessible
25 by at least a portion of the peer devices, each of the peer devices being configured to store information files, and further being configured to share content from selected information files with at least a portion of the other peer devices in the network, wherein each shared file in the network has a respective fingerprint ID associated therewith relating to its file content, the method comprising:

30 transmitting a first message to a first peer device, the first message corresponding to a request to retrieve a first file identified by a first fingerprint ID,

wherein the first message includes the first fingerprint ID, and wherein the first fingerprint ID is different than a filename associated with the first file; and

receiving a first portion of the file content of the first file from the first peer device in response to the first message.

5

15. The method of claim 14 further comprising:

detecting a failure in a file transfer process associated with the first peer device;

identifying a second portion of the first file content which has not been received;

and

10 transmitting a second message to a second peer device, the second message corresponding to a request to retrieve the second portion of the first file content identified by the first fingerprint ID, wherein the second message includes the first fingerprint ID.

15 16. A method for accessing information in a peer-to-peer network, the peer-to-peer network including a plurality of peer devices and a database system accessible by at least a portion of the peer devices, each of the peer devices being configured to store information files, and further being configured to share content from selected information files with at least a portion of the other peer devices in the network, wherein each shared file in the network has a respective HASH ID associated therewith relating to its file content, the HASH ID being different from a respective filename associated with each file, the method comprising:

receiving file information from selected peer devices, the file information relating to shared files stored at each of the selected peer devices;

25 the file information including a filename for each shared file, and including a HASH ID for each shared file;

storing the file information in at least one data structure at the database system;

and

identifying a desired shared file in the network using its associated HASH ID.

30

17. The method of claim 16 further comprising identifying an identity of a peer device using a selected HASH ID;

wherein the identified peer device has been identified as storing a file having an associated HASH ID which matches the selected HASH ID.

18. The method of claim 16 further comprising identifying a network address of a first peer device using a selected HASH ID;

wherein the first peer device has been identified as storing a file having an associated HASH ID which matches the selected HASH ID.

19. A method for accessing information in a peer-to-peer network, the peer-to-peer network including a plurality of peer devices and a database system accessible by at least a portion of the peer devices, each of the peer devices being configured to store information files, and further being configured to share content from selected information files with at least a portion of the other peer devices in the network, wherein each shared file in the network has a respective HASH ID associated therewith relating to its file content, the HASH ID being different from a respective filename associated with each file, the method comprising:

receiving a first message from a first peer device, the first message including a search request for locating files in the network which match a first search string;

- generating a first response to the first message, the response including a first list of file records relating to files stored in the network which match the first search string, wherein each file record includes an associated HASH ID and an associated filename; and

providing the first list of file records to the first peer device.

20. The method of claim 19 further comprising:

excluding from the first list of file records duplicate records in which multiple file records have the same associated HASH ID and filename.

21. The method of claim 19 further comprising:

- receiving a second message from the first peer device in response to the first response, the second message including at least one HASH ID;

identifying, using said at least one HASH ID, at least one network address corresponding to at least one peer device which has been identified as storing at least one file corresponding to the at least one HASH ID; and

- 5 providing, to the first peer device, a second response, the second response including address information which includes at least a portion of the at least one identified network addresses.

22. A method for accessing information in a peer-to-peer network, the peer-to-peer network including a plurality of peer devices and a database system accessible
10 by at least a portion of the peer devices, each of the peer devices being configured to store information files, and further being configured to share content from selected information files with at least a portion of the other peer devices in the network, wherein each shared file in the network has a respective HASH ID associated therewith relating to its file content, the HASH ID being different from a respective filename
15 associated with each file, the method comprising:

identifying a first network addresses corresponding to a first peer device which has been identified as storing a first information file associated with a first HASH ID;

- identifying a second network addresses corresponding to a second peer device which has been identified as storing a second information file associated with the first
20 HASH ID;

transmitting a first message to the first peer device requesting a first portion of file content of the first information file from the first peer device; and

- transmitting a second message to the second peer device requesting a second
25 portion of file content of the second information file from the second peer device.

23. The method of claim 22 wherein the first and second messages each include the first HASH ID.

24. The method of claim 22 wherein the first and second messages are
30 initiated at substantially a same time

25. The method of claim 22 wherein the requesting of the first portion of file content from the first peer device occurs concurrently with the requesting of the second portion of file content from the second peer device.

5 26. The method of claim 22 further comprising:
receiving the first portion of file content from the first peer device;
receiving the second portion of file content from the second peer device;
generating a third information file which includes the first and second portion of
file content, wherein the file content of the third information file is identical to the file
10 content of the first information file.

27. The method of claim 22 further comprising:
detecting a failure in a file transfer process associated with the first peer device;
identifying a third network addresses corresponding to a third peer device which
15 has been identified as storing a third information file associated with the first HASH
ID;
transmitting a third message to the third peer device, the third message
corresponding to a request to retrieve the first portion of file content from the third
information file.

20 28. The method of claim 22 wherein the first portion of file content
corresponds to a first chunk of bytes 1 to N of the first information file; and
wherein the second portion of file content corresponds to a second chunk of
bytes N+1 to 2N of the second information file.

25 29. A method for accessing information in a peer-to-peer network, the peer-
to-peer network including a plurality of peer devices and a database system accessible
by at least a portion of the peer devices, each of the peer devices being configured to
store information files, and further being configured to share content from selected
30 information files with at least a portion of the other peer devices in the network,
wherein each shared file in the network has a respective HASH ID associated therewith

relating to its file content, the HASH ID being different from a respective filename associated with each file, the method comprising:

- 5 requesting from a first plurality of peer devices a respective portion of file content from a respective information file, each respective information file being identified as having identical file content and having an identical first HASH ID being associated therewith.

30. The method of claim 29 further comprising:
receiving from at least a portion of the first plurality of peer devices respective
10 portions of file content from the respective information file; and
reconstructing the respective portions of file content to assemble a requested information file having file content identical to that corresponding to the first HASH ID being associated therewith.

- 15 31. The method of claim 29 further comprising:
before requesting a respective portion, creating a content map of the file content associated with the first HASH ID, said content map parceling the file content into respective portions from 1 to M.

- 20 32. The method of claim 31 further comprising:
assigning at least one respective portion, from 1 to M, to a first peer device of the first plurality of peer devices to request retrieval thereof.

- 25 33. The method of claim 32 further comprising:
receiving from the first peer device the one respective portion, from 1 to M, of file content from the respective information file; and
upon retrieval of the entire one respective portion from the first peer device, updating the content map corresponding to the retrieval thereof.

- 30 34. The method of claim 33 further comprising:
upon retrieval of all respective portions, from 1 to M, of file content, reconstructing the respective portions to assemble a requested information file having

file content identical to that corresponding to the first HASH ID being associated therewith.

35. The method of claim 29 further comprising:

- 5 identifying the network addresses corresponding a first plurality of peer devices, from 1 to X, each of the first plurality of peer devices being identified as storing a respective information file, each having identical file content and having an identical first HASH ID being associated therewith;

10 36. The method of claim 35 further comprising:

before requesting a respective portion, creating a content map of the file content associated with the first HASH ID, said content map parceling the file content into respective portions from 1 to M, where $M > X$.

15 37. A system for accessing information in a peer-to-peer network, the peer-to-peer network including a plurality of peer devices and a database system accessible by at least a portion of the peer devices, each of the peer devices being configured to store information files, and further being configured to share content from selected information files with at least a portion of the other peer devices in the network, the
20 system comprising:

at least one CPU

memory

at least one interface for communicating with other devices in the peer-to-peer network;

25 the system being configured or designed to select a first information file;

the system being further configured or designed to applying a fingerprinting algorithm to the content of the selected file to thereby generate a first fingerprint ID relating to the content of the first information file; and

30 the system being further configured or designed to identify the first information file using the first fingerprint ID.

38. The system of claim 37 wherein the fingerprinting algorithm corresponds to an MD5 Message-Digest algorithm.

39. The system of claim 37 wherein the fingerprinting algorithm
5 corresponds to a Secure Hash Algorithm (SHA1).

40. The system of claim 37 wherein the first information file is stored at a first peer device, and wherein the first information file has an associated first filename; and
10 wherein the system is further configured or designed to store the first filename and first fingerprint ID at the first peer device.

41. The system of claim 40 being further configured or designed to transmit the first filename and the first fingerprint ID to the database system for storage therein.
15

42. The system of claim 41 wherein the database system corresponds to a remote database system.

43. The system of claim 37 being further configured or designed to select a
20 second information file having content identical to the first information file;
the system being further configured or designed to apply the fingerprinting algorithm to the content of the second information file to thereby generate an identical first fingerprint ID to that of the first information file; and
the system being further configured or designed to identify both the first and the
25 second information file using the first unique fingerprint ID.

44. The system of claim 43 wherein the first information file is stored at a first peer device, and has a first associated filename, and wherein the second information file is stored at a second peer device, and has a second associated
30 filename;

the system being further configured or designed to store the first associated filename and first fingerprint ID associated with the first information file in the database system; and

- 5 the system being further configured or designed to store the second associated filename and first fingerprint ID associated with the second information file in the database system.

45. A system for accessing information in a peer-to-peer network, the peer-to-peer network including a plurality of peer devices and a database system accessible
10 by at least a portion of the peer devices, each of the peer devices being configured to store information files, and further being configured to share content from selected information files with at least a portion of the other peer devices in the network, wherein each shared file in the network has a respective fingerprint ID associated therewith relating to its file content, the system comprising:

- 15 at least one CPU

memory

at least one interface for communicating with other devices in the peer-to-peer network;

- 20 the system being configured or designed to transmit a first message to the database system, the first message including a search request for locating files in the network which match a first search string; and

the system being further configured or designed to receive a first response from the database system, the first response including first information relating to identified files stored in the network which match the first search string;

- 25 the first information further including an associated fingerprint ID for each identified file.

46. The system of claim 45 being further configured or designed to transmit a second message to the database system, the second message including a first
30 fingerprint ID selected from the first information; and

the system being further configured or designed to receive a second response from the database system in response to the second message;

the second response including second information, the second information including at least one network address corresponding to at least one peer device that has been identified as having access to at least one file corresponding to the first fingerprint ID.

5

47. The system of claim 46 being further configured or designed to transmit a third message to a first peer device of the at least one peer devices, the third message corresponding to a request to retrieve a first file identified by the first fingerprint ID.

10

48. The system of claim 47 wherein the third message includes the first fingerprint ID.

15

49. The system of claim 47 being further configured or designed to receive at least a portion of the file content of the first file from the first peer device in response to the third message.

20

50. A system for accessing information in a peer-to-peer network, the peer-to-peer network including a plurality of peer devices and a database system accessible by at least a portion of the peer devices, each of the peer devices being configured to store information files, and further being configured to share content from selected information files with at least a portion of the other peer devices in the network, wherein each shared file in the network has a respective fingerprint ID associated therewith relating to its file content, the system comprising:

25

at least one CPU

memory

at least one interface for communicating with other devices in the peer-to-peer network;

30

the system being configured or designed to transmit a first message to a first peer device, the first message corresponding to a request to retrieve a first file identified by a first fingerprint ID, wherein the first message includes the first fingerprint ID, and wherein the first fingerprint ID is different than a filename associated with the first file; and

the system being further configured or designed to receive a first portion of the file content of the first file from the first peer device in response to the first message.

51. The system of claim 50 being further configured or designed to detect a failure in a file transfer process associated with the first peer device;

the system being further configured or designed to identify a second portion of the first file content which has not been received; and

the system being further configured or designed to transmit a second message to a second peer device, the second message corresponding to a request to retrieve the second portion of the first file content identified by the first fingerprint ID, wherein the second message includes the first fingerprint ID.

52. A system for accessing information in a peer-to-peer network, the peer-to-peer network including a plurality of peer devices and a database system accessible by at least a portion of the peer devices, each of the peer devices being configured to store information files, and further being configured to share content from selected information files with at least a portion of the other peer devices in the network, wherein each shared file in the network has a respective HASH ID associated therewith relating to its file content, the HASH ID being different from a respective filename associated with each file, the system comprising:

at least one CPU

memory

at least one interface for communicating with other devices in the peer-to-peer network;

the system being configured or designed to receive file information from selected peer devices, the file information relating to shared files stored at each of the selected peer devices;

the file information including a filename for each shared file, and including a HASH ID for each shared file;

the system being further configured or designed to storing the file information in at least one data structure at the database system; and

the system being further configured or designed to identify a desired shared file in the network using its associated HASH ID.

53. The system of claim 52 being further configured or designed to identify an identity of a peer device using a selected HASH ID;

wherein the identified peer device has been identified as storing a file having an associated HASH ID which matches the selected HASH ID.

54. The system of claim 52 being further configured or designed to identify a network address of a first peer device using a selected HASH ID;

wherein the first peer device has been identified as storing a file having an associated HASH ID which matches the selected HASH ID.

55. A system for accessing information in a peer-to-peer network, the peer-to-peer network including a plurality of peer devices and a database system accessible by at least a portion of the peer devices, each of the peer devices being configured to store information files, and further being configured to share content from selected information files with at least a portion of the other peer devices in the network, wherein each shared file in the network has a respective HASH ID associated therewith relating to its file content, the HASH ID being different from a respective filename associated with each file, the system comprising:

at least one CPU

memory

at least one interface for communicating with other devices in the peer-to-peer network;

the system being configured or designed to receive a first message from a first peer device, the first message including a search request for locating files in the network which match a first search string;

the system being further configured or designed to generate a first response to the first message, the response including a first list of file records relating to files stored in the network which match the first search string, wherein each file record includes an associated HASH ID and an associated filename; and

the system being further configured or designed to provide the first list of file records to the first peer device.

56. The system of claim 55 further being further configured or designed to
5 exclude from the first list of file records duplicate records in which multiple file records have the same associated HASH ID and filename.

57. The system of claim 55 being further configured or designed to receive a
second message from the first peer device in response to the first response, the second
10 message including at least one HASH ID;

the system being further configured or designed to identify, using said at least
one HASH ID, at least one network address corresponding to at least one peer device
which has been identified as storing at least one file corresponding to the at least one
HASH ID; and

15 the system being further configured or designed to provide, to the first peer device, a second response, the second response including address information which includes at least a portion of the at least one identified network addresses.

58. A system for accessing information in a peer-to-peer network, the peer-
to-peer network including a plurality of peer devices and a database system accessible
20 by at least a portion of the peer devices, each of the peer devices being configured to store information files, and further being configured to share content from selected information files with at least a portion of the other peer devices in the network, wherein each shared file in the network has a respective HASH ID associated therewith
25 relating to its file content, the HASH ID being different from a respective filename associated with each file, the system comprising:

at least one CPU

memory

at least one interface for communicating with other devices in the peer-to-peer
30 network;

the system being configured or designed to identify a first network addresses corresponding to a first peer device which has been identified as storing a first information file associated with a first HASH ID;

5 the system being further configured or designed to identify a second network addresses corresponding to a second peer device which has been identified as storing a second information file associated with the first HASH ID;

the system being further configured or designed to transmit a first message to the first peer device request a first portion of file content of the first information file from the first peer device; and

10 the system being further configured or designed to transmit a second message to the second peer device request a second portion of file content of the second information file from the second peer device.

59. The system of claim 58 wherein the first and second messages each
15 include the first HASH ID.

60. The system of claim 58 wherein the first and second messages are initiated at substantially a same time

20 61. The system of claim 58 wherein the request of the first portion of file content from the first peer device occurs concurrently with the request of the second portion of file content from the second peer device.

25 62. The system of claim 58 being further configured or designed to receive the first portion of file content from the first peer device;

the system being further configured or designed to receive the second portion of file content from the second peer device; and

30 the system being further configured or designed to generate a third information file which includes the first and second portion of file content, wherein the file content of the third information file is identical to the file content of the first information file.

63. The system of claim 58 being further configured or designed to detect a failure in a file transfer process associated with the first peer device;

the system being further configured or designed to identify a third network addresses corresponding to a third peer device which has been identified as storing a third information file associated with the first HASH ID;

the system being further configured or designed to transmit a third message to the third peer device, the third message corresponding to a request to retrieve the first portion of file content from the third information file.

64. The system of claim 58 wherein the first portion of file content corresponds to a first chunk of bytes 1 to N of the first information file; and

wherein the second portion of file content corresponds to a second chunk of bytes N+1 to 2N of the second information file.

65. A system for accessing information in a peer-to-peer network, the peer-to-peer network including a plurality of peer devices and a database system accessible by at least a portion of the peer devices, each of the peer devices being configured to store information files, and further being configured to share content from selected information files with at least a portion of the other peer devices in the network, wherein each shared file in the network has a respective HASH ID associated therewith relating to its file content, the HASH ID being different from a respective filename associated with each file, the system comprising:

at least one CPU

memory

at least one interface for communicating with other devices in the peer-to-peer network;

the system being configured or designed to request from a first plurality of peer devices a respective portion of file content from a respective information file, each respective information file being identified as having identical file content and having an identical first HASH ID being associated therewith.

66. The system of claim 65 being further configured or designed to receive from at least a portion of the first plurality of peer devices respective portions of file content from the respective information file; and

the system being further configured or designed to reconstruct the respective
5 portions of file content to assemble a requested information file having file content identical to that corresponding to the first HASH ID being associated therewith.

67. The system of claim 65 being further configured or designed to create, before request a respective portion, a content map of the file content associated with the
10 first HASH ID, said content map parceling the file content into respective portions from 1 to M.

68. The system of claim 67 being further configured or designed to assign at least one respective portion, from 1 to M, to a first peer device of the first plurality of
15 peer devices to request retrieval thereof.

69. The system of claim 68 being further configured or designed to receive from the first peer device the one respective portion, from 1 to M, of file content from the respective information file; and
20 the system being further configured or designed to update, upon retrieval of the entire one respective portion from the first peer device, the content map corresponding to the retrieval thereof.

70. The system of claim 69 being further configured or designed to reconstruct, upon retrieval of all respective portions, from 1 to M, of file content, the respective portions to assemble a requested information file having file content identical to that corresponding to the first HASH ID being associated therewith.

71. The system of claim 65 being further configured or designed to identify
30 the network addresses corresponding a first plurality of peer devices, from 1 to X, each of the first plurality of peer devices being identified as storing a respective information

file, each having identical file content and having an identical first HASH ID being associated therewith;

72. The system of claim 71 being further configured or designed to create,
5 before request a respective portion, a content map of the file content associated with the first HASH ID, said content map parceling the file content into respective portions from 1 to M, where $M > X$.

73. A computer program product for accessing information in a peer-to-peer
10 network, the peer-to-peer network including a plurality of peer devices and a database system accessible by at least a portion of the peer devices, each of the peer devices being configured to store information files, and further being configured to share content from selected information files with at least a portion of the other peer devices in the network, the computer program product comprising:

15 a computer usable medium having computer readable code embodied therein, the computer readable code comprising:

computer code for selecting a first information file;

computer code for generating, using fingerprinting algorithm, a first fingerprint
ID relating to the content of the first information file; and

20 computer code for identifying the first information file using the first fingerprint ID.

74. The computer program product of claim 73 wherein the fingerprinting
algorithm corresponds to an MD5 Message-Digest algorithm.

25

75. The computer program product of claim 73 wherein the fingerprinting
algorithm corresponds to a Secure Hash Algorithm (SHA1).

76. The computer program product of claim 73 wherein the first information
30 file is stored at a first peer device, and wherein the first information file has an associated first filename, the computer program product comprising:

computer code for storing the first filename and first fingerprint ID at the first peer device.

77. The computer program product of claim 76 further comprising:
5 computer code for transmitting the first filename and the first fingerprint ID to the database system for storage therein.

78. The computer program product of claim 77 wherein the database system corresponds to a remote database system.
10

79. The computer program product of claim 73 further comprising:
computer code for selecting a second information file having content identical to the first information file;

computer code for applying the fingerprinting algorithm to the content of the
15 second information file to thereby generate an identical first fingerprint ID to that of the first information file; and

computer code for identifying both the first and the second information file using the first unique fingerprint ID.

80. The computer program product of claim 79 wherein the first information file is stored at a first peer device, and has a first associated filename, and wherein the second information file is stored at a second peer device, and has a has second associated filename, the computer program product further comprising:
20

computer code for storing the first associated filename and first fingerprint ID
25 associated with the first information file in the database system; and

computer code for storing the second associated filename and first fingerprint ID associated with the second information file in the database system.

81. A computer program product for accessing information in a peer-to-peer
30 network, the peer-to-peer network including a plurality of peer devices and a database system accessible by at least a portion of the peer devices, each of the peer devices being configured to store information files, and further being configured to share

content from selected information files with at least a portion of the other peer devices in the network, wherein each shared file in the network has a respective fingerprint ID associated therewith relating to its file content, the computer program product comprising:

- 5 a computer usable medium having computer readable code embodied therein, the computer readable code comprising:

 computer code for transmitting a first message to the database system, the first message including a search request for locating files in the network which match a first search string; and

- 10 computer code for receiving a first response from the database system, the first response including first information relating to identified files stored in the network which match the first search string;

 the first information further including an associated fingerprint ID for each identified file.

15

82. A computer program product for accessing information in a peer-to-peer network, the peer-to-peer network including a plurality of peer devices and a database system accessible by at least a portion of the peer devices, each of the peer devices being configured to store information files, and further being configured to share content from selected information files with at least a portion of the other peer devices in the network, wherein each shared file in the network has a respective fingerprint ID associated therewith relating to its file content, the computer program product comprising:

- 20 a computer usable medium having computer readable code embodied therein, the computer readable code comprising:

 computer code for transmitting a first message to a first peer device, the first message corresponding to a request to retrieve a first file identified by a first fingerprint ID, wherein the first message includes the first fingerprint ID, and wherein the first fingerprint ID is different than a filename associated with the first file; and

- 30 computer code for receiving a first portion of the file content of the first file from the first peer device in response to the first message.

83. A computer program product for accessing information in a peer-to-peer network, the peer-to-peer network including a plurality of peer devices and a database system accessible by at least a portion of the peer devices, each of the peer devices being configured to store information files, and further being configured to share content from selected information files with at least a portion of the other peer devices in the network, wherein each shared file in the network has a respective HASH ID associated therewith relating to its file content, the HASH ID being different from a respective filename associated with each file, the computer program product comprising:

10 a computer usable medium having computer readable code embodied therein, the computer readable code comprising:

computer code for receiving file information from selected peer devices, the file information relating to shared files stored at each of the selected peer devices;

the file information including a filename for each shared file, and including a
15 HASH ID for each shared file;

computer code for storing the file information in at least one data structure at the database system; and

computer code for identifying a desired shared file in the network using its associated HASH ID.

20

84. A computer program product for accessing information in a peer-to-peer network, the peer-to-peer network including a plurality of peer devices and a database system accessible by at least a portion of the peer devices, each of the peer devices being configured to store information files, and further being configured to share content from selected information files with at least a portion of the other peer devices in the network, wherein each shared file in the network has a respective HASH ID associated therewith relating to its file content, the HASH ID being different from a respective filename associated with each file, the computer program product comprising:

30 a computer usable medium having computer readable code embodied therein, the computer readable code comprising:

computer code for receiving a first message from a first peer device, the first message including a search request for locating files in the network which match a first search string;

- 5 computer code for generating a first response to the first message, the response including a first list of file records relating to files stored in the network which match the first search string, wherein each file record includes an associated HASH ID and an associated filename; and

computer code for providing the first list of file records to the first peer device.

- 10 85. A computer program product for accessing information in a peer-to-peer network, the peer-to-peer network including a plurality of peer devices and a database system accessible by at least a portion of the peer devices, each of the peer devices being configured to store information files, and further being configured to share content from selected information files with at least a portion of the other peer devices
15 in the network, wherein each shared file in the network has a respective HASH ID associated therewith relating to its file content, the HASH ID being different from a respective filename associated with each file, the computer program product comprising:

- a computer usable medium having computer readable code embodied therein,
20 the computer readable code comprising:

computer code for identifying a first network addresses corresponding to a first peer device which has been identified as storing a first information file associated with a first HASH ID;

- computer code for identifying a second network addresses corresponding to a
25 second peer device which has been identified as storing a second information file associated with the first HASH ID;

computer code for transmitting a first message to the first peer device requesting a first portion of file content of the first information file from the first peer device; and

- computer code for transmitting a second message to the second peer device
30 requesting a second portion of file content of the second information file from the second peer device.

86. A system for accessing information in a peer-to-peer network, the peer-to-peer network including a plurality of peer devices and a database system accessible by at least a portion of the peer devices, each of the peer devices being configured to store information files, and further being configured to share content from selected information files with at least a portion of the other peer devices in the network, wherein each shared file in the network has a respective HASH ID associated therewith relating to its file content, the HASH ID being different from a respective filename associated with each file, the system comprising:

means for identifying a first network addresses corresponding to a first peer device which has been identified as storing a first information file associated with a first HASH ID;

means for identifying a second network addresses corresponding to a second peer device which has been identified as storing a second information file associated with the first HASH ID;

means for transmitting a first message to the first peer device requesting a first portion of file content of the first information file from the first peer device; and

means for transmitting a second message to the second peer device requesting a second portion of file content of the second information file from the second peer device.

87. A system for accessing information in a peer-to-peer network, the peer-to-peer network including a plurality of peer devices and a database system accessible by at least a portion of the peer devices, each of the peer devices being configured to store information files, and further being configured to share content from selected information files with at least a portion of the other peer devices in the network, wherein each shared file in the network has a respective HASH ID associated therewith relating to its file content, the HASH ID being different from a respective filename associated with each file, the system comprising:

means for receiving a first message from a first peer device, the first message including a search request for locating files in the network which match a first search string;

means for generating a first response to the first message, the response including a first list of file records relating to files stored in the network which match the first search string, wherein each file record includes an associated HASH ID and an associated filename; and

5 means for providing the first list of file records to the first peer device.

11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162
163
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258
259
260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316
317
318
319
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334
335
336
337
338
339
340
341
342
343
344
345
346
347
348
349
350
351
352
353
354
355
356
357
358
359
360
361
362
363
364
365
366
367
368
369
370
371
372
373
374
375
376
377
378
379
380
381
382
383
384
385
386
387
388
389
390
391
392
393
394
395
396
397
398
399
400
401
402
403
404
405
406
407
408
409
410
411
412
413
414
415
416
417
418
419
420
421
422
423
424
425
426
427
428
429
430
431
432
433
434
435
436
437
438
439
440
441
442
443
444
445
446
447
448
449
450
451
452
453
454
455
456
457
458
459
460
461
462
463
464
465
466
467
468
469
470
471
472
473
474
475
476
477
478
479
480
481
482
483
484
485
486
487
488
489
490
491
492
493
494
495
496
497
498
499
500
501
502
503
504
505
506
507
508
509
510
511
512
513
514
515
516
517
518
519
520
521
522
523
524
525
526
527
528
529
530
531
532
533
534
535
536
537
538
539
540
541
542
543
544
545
546
547
548
549
550
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
567
568
569
570
571
572
573
574
575
576
577
578
579
580
581
582
583
584
585
586
587
588
589
590
591
592
593
594
595
596
597
598
599
600
601
602
603
604
605
606
607
608
609
610
611
612
613
614
615
616
617
618
619
620
621
622
623
624
625
626
627
628
629
630
631
632
633
634
635
636
637
638
639
640
641
642
643
644
645
646
647
648
649
650
651
652
653
654
655
656
657
658
659
660
661
662
663
664
665
666
667
668
669
670
671
672
673
674
675
676
677
678
679
680
681
682
683
684
685
686
687
688
689
690
691
692
693
694
695
696
697
698
699
700
701
702
703
704
705
706
707
708
709
710
711
712
713
714
715
716
717
718
719
720
721
722
723
724
725
726
727
728
729
730
731
732
733
734
735
736
737
738
739
740
741
742
743
744
745
746
747
748
749
750
751
752
753
754
755
756
757
758
759
760
761
762
763
764
765
766
767
768
769
770
771
772
773
774
775
776
777
778
779
780
781
782
783
784
785
786
787
788
789
790
791
792
793
794
795
796
797
798
799
800
801
802
803
804
805
806
807
808
809
810
811
812
813
814
815
816
817
818
819
820
821
822
823
824
825
826
827
828
829
830
831
832
833
834
835
836
837
838
839
840
841
842
843
844
845
846
847
848
849
850
851
852
853
854
855
856
857
858
859
860
861
862
863
864
865
866
867
868
869
870
871
872
873
874
875
876
877
878
879
880
881
882
883
884
885
886
887
888
889
890
891
892
893
894
895
896
897
898
899
900
901
902
903
904
905
906
907
908
909
910
911
912
913
914
915
916
917
918
919
920
921
922
923
924
925
926
927
928
929
930
931
932
933
934
935
936
937
938
939
940
941
942
943
944
945
946
947
948
949
950
951
952
953
954
955
956
957
958
959
960
961
962
963
964
965
966
967
968
969
970
971
972
973
974
975
976
977
978
979
980
981
982
983
984
985
986
987
988
989
990
991
992
993
994
995
996
997
998
999
1000
1001
1002
1003
1004
1005
1006
1007
1008
1009
1010
1011
1012
1013
1014
1015
1016
1017
1018
1019
1020
1021
1022
1023
1024
1025
1026
1027
1028
1029
1030
1031
1032
1033
1034
1035
1036
1037
1038
1039
1040
1041
1042
1043
1044
1045
1046
1047
1048
1049
1050
1051
1052
1053
1054
1055
1056
1057
1058
1059
1060
1061
1062
1063
1064
1065
1066
1067
1068
1069
1070
1071
1072
1073
1074
1075
1076
1077
1078
1079
1080
1081
1082
1083
1084
1085
1086
1087
1088
1089
1090
1091
1092
1093
1094
1095
1096
1097
1098
1099
1100
1101
1102
1103
1104
1105
1106
1107
1108
1109
1110
1111
1112
1113
1114
1115
1116
1117
1118
1119
1120
1121
1122
1123
1124
1125
1126
1127
1128
1129
1130
1131
1132
1133
1134
1135
1136
1137
1138
1139
1140
1141
1142
1143
1144
1145
1146
1147
1148
1149
1150
1151
1152
1153
1154
1155
1156
1157
1158
1159
1160
1161
1162
1163
1164
1165
1166
1167
1168
1169
1170
1171
1172
1173
1174
1175
1176
1177
1178
1179
1180
1181
1182
1183
1184
1185
1186
1187
1188
1189
1190
1191
1192
1193
1194
1195
1196
1197
1198
1199
1200
1201
1202
1203
1204
1205
1206
1207
1208
1209
1210
1211
1212
1213
1214
1215
1216
1217
1218
1219
1220
1221
1222
1223
1224
1225
1226
1227
1228
1229
1230
1231
1232
1233
1234
1235
1236
1237
1238
1239
1240
1241
1242
1243
1244
1245
1246
1247
1248
1249
1250
1251
1252
1253
1254
1255
1256
1257
1258
1259
1260
1261
1262
1263
1264
1265
1266
1267
1268
1269
1270
1271
1272
1273
1274
1275
1276
1277
1278
1279
1280
1281
1282
1283
1284
1285
1286
1287
1288
1289
1290
1291
1292
1293
1294
1295
1296
1297
1298
1299
1300
1301
1302
1303
1304
1305
1306
1307
1308
1309
1310
1311
1312
1313
1314
1315
1316
1317
1318
1319
1320
1321
1322
1323
1324
1325
1326
1327
1328
1329
1330
1331
1332
1333
1334
1335
1336
1337
1338
1339
1340
1341
1342
1343
1344
1345
1346
1347
1348
1349
1350
1351
1352
1353
1354
1355
1356
1357
1358
1359
1360
1361
1362
1363
1364
1365
1366
1367
1368
1369
1370
1371
1372
1373
1374
1375
1376
1377
1378
1379
1380
1381
1382
1383
1384
1385
1386
1387
1388
1389
1390
1391
1392
1393
1394
1395
1396
1397
1398
1399
1400
1401
1402
1403
1404
1405
1406
1407
1408
1409
1410
1411
1412
1413
1414
1415
1416
1417
1418
1419
1420
1421
1422
1423
1424
1425
1426
1427
1428
1429
1430
1431
1432
1433
1434
1435
1436
1437
1438
1439
1440
1441
1442
1443
1444
1445
1446
1447
1448
1449
1450
1451
1452
1453
1454
1455
1456
1457
1458
1459
1460
1461
1462
1463
1464
1465
1466
1467
1468
1469
1470
1471
1472
1473
1474
1475
1476
1477
1478
1479
1480
1481
1482
1483
1484
1485
1486
1487
1488
1489
1490
1491
1492
1493
1494
1495
1496
1497
1498
1499
1500
1501
1502
1503
1504
1505
1506
1507
1508
1509
1510
1511
1512
1513
1514
1515
1516
1517
1518
1519
1520
1521
1522
1523
1524
1525
1526
1527
1528
1529
1530
1531
1532
1533
1534
1535
1536
1537
1538
1539
1540
1541
1542
1543
1544
1545
1546
1547
1548
1549
1550
1551
1552
1553
1554
1555
1556
1557
1558
1559
1560
1561
1562
1563
1564
1565
1566
1567
1568
1569
1570
1571
1572
1573
1574
1575
1576
1577
1578
1579
1580
1581
1582
1583
1584
1585
1586
1587
1588
1589
1590
1591
1592
1593
1594
1595
1596
1597
1598
1599
1600
1601
1602
1603
1604
1605
1606
1607
1608
1609
1610
1611
1612
1613
1614
1615
1616
1617
1618
1619
1620
1621
1622
1623
1624
1625
1626
1627
1628
1629
1630
1631
1632
1633
1634
1635
1636
1637
1638
1639
1640
1641
1642
1643
1644
1645
1646
1647
1648
1649
1650
1651
1652
1653
1654
1655
1656
1657
1658
1659
1660
1661
1662
1663
1664
1665
1666
1667
1668
1669
1670
1671
1672
1673
1674
1675
1676
1677
1678
1679
1680
1681
1682
1683
1684
1685
1686
1687
1688
1689
1690
1691
1692
1693
1694
1695
1696
1697
1698
1699
1700
1701
1702
1703
1704
1705
1706
1707
1708
1709
1710
1711
1712
1713
1714
1715
1716
1717
1718
1719
1720
1721
1722
1723
1724
1725
1726
1727
1728
1729
1730
1731
1732
1733
1734
1735
1736
1737
1738
1739
1740
1741
1742
1743
1744
1745
1746
1747
1748
1749
1750
1751
1752
1753
1754
1755
1756
1757
1758
1759
1760
1761
1762
1763
1764
1765
1766
1767
1768
1769
1770
1771
1772
1773
1774
1775
1776
1777
1778
1779
1780
1781
1782
1783
1784
1785
1786
1787
1788
1789
1790
1791
1792
1793
1794
1795
1796
1797
1798
1799
1800
1801
1802
1803
1804
1805
1806
1807
1808
1809
1810
1811
1812
1813
1814
1815
1816
1817
1818
1819
1820
1821
1822
1823
1824
1825
1826
1827
1828
1829
1830
1831
1832
1833
1834
1835
1836
1837
1838
1839
1840
1841
1842
1843
1844
1845
1846
1847
1848
1849
1850
1851
1852
1853
1854
1855
1856
1857
1858
1859
1860
1861
1862
1863
1864
1865
1866
1867
1868
1869
1870
1871
1872
1873
1874
1875
1876
1877
1878
1879
1880
1881
1882
1883
1884
1885
1886
1887
1888
1889
1890
1891
1892
1893
1894
1895
1896
1897
1898
1899
1900
1901
1902
1903
1904
1905
1906
1907
1908
1909
1910
1911
1912
1913
1914
1915
1916
1917
1918
1919
1920
1921
1922
1923
1924
1925
1926
1927
1928
1929
1930
1931
1932
1933
1934
1935
1936
1937
1938
1939
1940
1941
1942
1943
1944
1945
1946
1947
1948
1949
1950
1951
1952
1953
1954
1955
1956
1957
1958
1959
1960
1961
1962
1963
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
2036
2037
2038
2039
2040
2041
2042
2043
2044
2045
2046
2047
2048
2049
2050
2051
2052
2053
2054
2055
2056
2057
2058
2059
2060
2061
2062
2063
2064
2065
2066
2067
2068
2069
2070
2071
2072
2073
2074
2075
2076
2077
2078
2079
2080
2081
2082
2083
2084
2085
2086
2087
2088
2089
2090
2091
2092
2093
2094
2095
2096
2097
2098
2099
2100
2101
2102
2103
2104
2105
2106
2107
2108
2109
2110
2111
2112
2113
2114
2115
2116
2117
2118
2119
2120
2121
2122
2123
2124
2125
2126
2127
2128
2129
2130
2131
2132
2133
2134
2135
2136
2137
2138
2139
2140
2141
2142
2143
2144
2145
2146
2147
2148
2149
2150
2151
2152
2153
2154
2155
2156
2157
2158
2159
2160
2161
2162
2163
2164
2165
2166
2167
2168
2169
2170
2171
2172
2173
2174
2175
2176
2177
2178
2179
2180
2181
2182
2183
2184
2185
2186
2187
2188
2189
2190
2191
2192
2193
2194
2195
2196
2197
2198
2199
2200
2201
2202
2203
2204
2205
2206
2207
2208
2209
2210
2211
2212
2213
2214
2215
2216
2217
2218
2219
2220
2221
2222
2223
2224
2225
2226
2227
2228